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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/689,390	BEAUMONT, MARK	
	Examiner	Art Unit	
	JACOB PETRANEK	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 March 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15,22-29 and 36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15,22-29 and 36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-15, 22-29, and 36 are pending.

2. The office acknowledges the following papers:

Claims and arguments filed on 3/19/2010.

Maintained Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-6, 8-13, 15, 22-27, 29, and 36 are rejected under 35 U.S.C. §103(a) as being unpatentable over Crozier (U.S. 5,081,700), in view of Pechanek et al. (U.S. 6,338,129).

5. As per claim 1:

Crozier disclosed a method of rotating data in a plurality of processing elements, comprising:

a plurality of shifting operations (Crozier: Figures 5a-d, column 5 lines 39-58)(Figure 5 shows a plurality of shift operations between figures 5b-d amongst the individual rows and columns being shifted different amounts.), each shifting operation being performed such that each processing element in each row or column receives the data originally held by every other processing element in that row or column, respectively (Crozier: Figures 5a-d, column 5 lines 39-58)(Figure 5 shows a plurality of

shift operations between figures 5b-d amongst the individual rows and columns being shifted different amounts. Each figure shows a single shifting operation that is shifted in such a way that each location receives every data held in every position of the row/column. Thus, there is a plurality of shifting operations (i.e. three, one from each figure) that receive data from every location within the row/column.);

a plurality of selecting operations on said received data, where each of the received data is a candidate for selection (Crozier: Figures 5a-d, column 5 lines 39-58)(After each shifting operation in figures 5a-c, data is selected to be stored prior to the next shifting operation in a different direction. Any received data can be possibly selected based on the number of required shifts in a given direction.), said shifting and selecting operations coordinated to enable a three shears operation to be performed on the data (Crozier: Figures 5a-d, column 5 lines 39-58)(A three shears operation involves three separate shifts on data. The method of rotating data in figure 5 involves 3 separate shifts. Figure 5b involves a down shift, figure 5c involves a left shift, and figure 5d involves an up shift. The shifting results in a 90-degree rotation of the data.).

Crozier failed to teach shifting and selecting operations are performed by a plurality of processing elements connected in an array.

However, Pechanek disclosed shifting and selecting operations are performed by a plurality of processing elements connected in an array (Pechanek: Figure 1a, column 1 lines 46-67 continued to column 2 lines 1-28)(The shifting and storing operations done by Crozier in combination with Pechanek result in operations being done in processing elements.).

Image processing is an example of an application that can be done efficiently on a parallel processor (Pechanek: Column 1 lines 13-20). One of ordinary skill in the art would have been motivated to find such image processing applications that work on the parallel processing unit Pechanek uses to find Crozier's method of image rotation. Thus, it would have been obvious to one of ordinary skill in the art to implement Crozier's method of image rotation on the parallel processor of Pechanek for the advantage of being able to efficiently process the images.

6. As per claim 2:

Crozier and Pechanek disclosed the method of claim 1 wherein said plurality of selecting operations are responsive to initial counts (Crozier: Figure 2 elements 37 and 48, column 3 lines 24-31 and column 4 lines 12-22)(Crozier disclosed maintaining counters for the shifting being done to perform the 90-degree rotation. It's inherent that there is an initial count determined to know how many shift operations will be done.).

Crozier and Pechanek failed to teach where one of said initial counts which are either loaded into at least one of said processing elements or calculated locally based on the processing element's location.

However, one of ordinary skill in the art would recognize that the shifting counters placement doesn't have an effect on the process of shifting the data and could be placed anywhere. Thus, it would have been obvious to one of ordinary skill in the art to implement shift counters within the processing elements to determine how many shift operations are left. In addition, according to "In re Japikse" (181 F.2d 1019, 86 USPQ 70 (CCPA 1950)), shifting the location of parts doesn't give patentability over prior art.

7. As per claim 3:

Crozier and Pechanek disclosed the method of claim 2 additionally comprising maintaining a current count in each processing element for each initial count, said current counts being responsive to said initial counts and the number of data shifts performed (Crozier: Figure 2 elements 37 and 48, column 3 lines 24-31 and column 4 lines 12-22)(It would have been obvious to one of ordinary skill in the art at the time of the invention that the counters could have been initially set and decremented until the data arrived in the correct place to perform the 90-degree rotation as shown in figures 5b-d.).

8. As per claim 4:

Crozier and Pechanek disclosed the method of claim 3 wherein said maintaining current counts includes altering said initial counts at programmable intervals by a programmable amount (Crozier: Figure 2 elements 37 and 48, column 3 lines 24-31 and column 4 lines 12-22)(It would have been obvious to one of ordinary skill in the art at the time of the invention that the counters could have been initially set and decremented until the data arrived in the correct place to perform the 90-degree rotation as shown in figures 5b-d.).

9. As per claim 5:

Crozier and Pechanek disclosed the method of claim 4 wherein said initial counts are decremented in response to a shifting of data to produce said current counts (Crozier: Figure 2 elements 37 and 48, column 3 lines 24-31 and column 4 lines 12-22)(It would have been obvious to one of ordinary skill in the art at the time of the

invention that the counters could have been initially set and decremented until the data arrived in the correct place to perform the 90-degree rotation as shown in figures 5b-d.).

10. As per claim 6:

Crozier and Pechanek disclosed the method of claim 5 wherein a selecting operation is performed when a current count in a processing element is non-positive (Crozier: Figure 2 elements 37 and 48, column 3 lines 24-31 and column 4 lines 12-22)(It would have been obvious to one of ordinary skill in the art at the time of the invention that the counters could have been initially set and decremented until the data arrived in the correct place to perform the 90-degree rotation as shown in figures 5b-d. Additionally, it would have been obvious to one of ordinary skill in the art that upon reaching zero, the data values would be stored so that the next shifting could occur with the data in the correct places.).

11. As per claim 8:

Crozier and Pechanek disclosed a method of rotating data in a plurality of processing elements connected in an array, comprising:

a first shifting of a plurality of data in a first direction along one of a row or a column (Crozier: Figures 5a-b, column 5 lines 39-58)(The first shift is a down shift along the leftmost column.) until each processing element in each row or column has received data originally held by every other processing elements in that row or column, respectively (Crozier: Figures 5a-b, column 5 lines 39-58)(The leftmost column shifting in figures 5a-b shows a single shifting operation that is shifted in such a way that each location receives every data held in every position of the row/column.);

a first selection of data from said received data, where each of the received data is a candidate for selection, in response to said first shifting and the positions of said plurality of processing elements (Crozier: Figures 5a-b, column 5 lines 39-58)(Pechanek: Figure 1a, column 1 lines 46-67 continued to column 2 lines 1-28)(After the shifting operation between figures 5a-b, data is selected to be stored prior to the next shifting operation in a different direction. Any received data can be possibly selected based on the number of required shifts in a given direction. The combination with Pechanek results in the image processing operation taking place on an array of processing elements.);

a second shifting of said plurality of data in a second direction perpendicular to said first direction along one of a row or column (Crozier: Figures 5b-c, column 5 lines 39-58)(The second shift is a left shift perpendicular to the first down shift along the topmost row.) until each processing element in each row or column has received data originally held by every other processing elements in that row or column, respectively (Crozier: Figures 5b-c, column 5 lines 39-58)(The topmost row shifting in figures 5b-c shows a single shifting operation that is shifted in such a way that each location receives every data held in every position of the row/column.);

a second selection of data from said received data, where each of the received data is a candidate for selection, in response to said second shifting and the positions of said plurality of processing elements (Crozier: Figures 5b-c, column 5 lines 39-58)(Pechanek: Figure 1a, column 1 lines 46-67 continued to column 2 lines 1-28)(After the shifting operation between figures 5b-c, data is selected to be stored prior to the next

shifting operation in a different direction. Any received data can be possibly selected based on the number of required shifts in a given direction. The combination with Pechanek results in the image processing operation taking place on an array of processing elements.);

a third shifting of said plurality of data in a third direction opposite to said first direction along one of a row or a column (Crozier: Figures 5c-d, column 5 lines 39-58)(The third shift is an up shift along the rightmost column in an opposite direction of the first shift.) until each processing element in each row or column has received data originally held by every other processing elements in that row or column, respectively (Crozier: Figures 5c-d, column 5 lines 39-58)(The rightmost column shifting in figures 5c-d shows a single shifting operation that is shifted in such a way that each location receives every data held in every position of the row/column.);

a third selection of data from said received data, where each of the received data is a candidate for selection, in response to said third shifting and the positions of said plurality of processing elements (Crozier: Figures 5c-d, column 5 lines 39-58)(Pechanek: Figure 1a, column 1 lines 46-67 continued to column 2 lines 1-28)(After the shifting operation between figures 5c-d, data is selected to be stored prior to the next shifting operation in a different direction. Any received data can be possibly selected based on the number of required shifts in a given direction. The combination with Pechanek results in the image processing operation taking place on an array of processing elements.).

Image processing is an example of an application that can be done efficiently on

a parallel processor (Pechanek: Column 1 lines 13-20). One of ordinary skill in the art would have been motivated to find such image processing applications that work on the parallel processing unit Pechanek uses to find Crozier's method of image rotation. Thus, it would have been obvious to one of ordinary skill in the art to implement Crozier's method of image rotation on the parallel processor of Pechanek for the advantage of being able to efficiently process the images.

12. As per claim 9:

Crozier and Pechanek disclosed the method of claim 8 wherein said first, second and third selection of data are responsive to initial counts (Crozier: Figure 2 elements 37 and 48, column 3 lines 24-31 and column 4 lines 12-22)(Crozier disclosed maintaining counters for the shifting being done to perform the 90-degree rotation. It's inherent that there is an initial count determined to know how many shift operations will be done.).

Crozier and Pechanek failed to teach where one of said initial counts, which are either loaded into at least one, said processing elements or calculated locally based on the processing element's location.

However, one of ordinary skill in the art would recognize that the shifting counters placement doesn't have an effect on the process of shifting the data and could be placed anywhere. Thus, it would have been obvious to one of ordinary skill in the art to implement shift counters within the processing elements to determine how many shift operations are left. In addition, according to "In re Japikse" (181 F.2d 1019, 86 USPQ 70 (CCPA 1950)), shifting the location of parts doesn't give patentability over prior art.

13. As per claim 10:

Claim 10 essentially recites the same limitations of claim 3. Therefore, claim 10 is rejected for the same reasons as claim 3.

14. As per claim 11:

Claim 11 essentially recites the same limitations of claim 4. Therefore, claim 11 is rejected for the same reasons as claim 4.

15. As per claim 12:

Claim 12 essentially recites the same limitations of claim 5. Therefore, claim 12 is rejected for the same reasons as claim 5.

16. As per claim 13:

Claim 13 essentially recites the same limitations of claim 6. Therefore, claim 13 is rejected for the same reasons as claim 6.

17. As per claim 15:

Crozier and Pechanek disclosed the method of claim 8, wherein:

said first shifting and selection operations are coordinated to enable a first shear operation to be performed in said first direction (Crozier: Figures 5a-b, column 5 lines 39-58)(The first shear direction in figures 5a-b is down.);

said second shifting and selection operations are coordinated to enable a second shear operation to be performed in said second direction (Crozier: Figures 5b-c, column 5 lines 39-58)(The second shear direction in figures 5b-c is left.);

said third shifting and selection operations are coordinated to enable a third shear operation to be performed in said third direction (Crozier: Figures 5c-d, column 5 lines 39-58)(The third shear direction in figures 5c-d is up.);

18. As per claim 22:

Claim 22 essentially recites the same limitations of claim 8. Claim 22 additionally recites the following limitations:

Crozier and Pechanek failed to teach first shifting on a plurality of data in done in a first pair of directions, second shifting on a plurality of data in done in a second pair of directions, and third shifting on a plurality of data in done in a third pair of directions.

However, it would have been obvious to one of ordinary skill in the art to perform a pair of shifts for each cycle of shifting. Looking at figure 5 in Crozier, the data to be shifted 90-degrees is an 8x8 matrix. Looking at figure 5b, the shifting that occurs is downward from figure 5a. The left-most column is shifted down 7 spaces, with the columns to the right being shifted down 6, 5, 4, 3, 2, 1, and 0 spaces respectively. One of ordinary skill in the art would recognize that the left-most column in figure 5a containing the letter 'a' could instead be shifted up 1 space to achieve the same arrangement as shown in figure 5b. One of ordinary skill in the art would also realize the same up shifting process could be applied to shift the columns going down 6 and 5 spaces and instead shift up 2 and 3 spaces respectively. One of ordinary skill in the art would realize that this process of shifting two different directions would result in a total of 12 shifting cycles being saved. Thus, it would have been obvious to one of ordinary skill in the art to implement shifting in a pair of directions to increase the performance of the rotation process.

19. As per claim 23:

Claim 23 essentially recites the same limitations of claim 9. Therefore, claim 23 is rejected for the same reasons as claim 9.

20. As per claim 24:

Claim 24 essentially recites the same limitations of claim 3. Therefore, claim 24 is rejected for the same reasons as claim 3.

21. As per claim 25:

Claim 25 essentially recites the same limitations of claim 4. Therefore, claim 25 is rejected for the same reasons as claim 4.

22. As per claim 26:

Claim 26 essentially recites the same limitations of claim 5. Therefore, claim 26 is rejected for the same reasons as claim 5.

23. As per claim 27:

Claim 27 essentially recites the same limitations of claim 6. Therefore, claim 27 is rejected for the same reasons as claim 6.

24. As per claim 29:

Claim 29 essentially recites the same limitations of claim 15. Therefore, claim 29 is rejected for the same reasons as claim 15.

25. As per claim 36:

Claim 36 essentially recites the same limitations of claim 1. Therefore, claim 36 is rejected for the same reasons as claim 1.

26. Claims 7, 14, and 28 are rejected under 35 U.S.C. §103(a) as being unpatentable over Crozier (U.S. 5,081,700), in view of Pechanek et al. (U.S. 6,338,129), further in view of Taylor (U.S. 4,992,933).

27. As per claim 7:

Crozier and Pechanek disclosed the method of claim 1.

Crozier and Pechanek failed to teach selecting which processing elements are active in response to a row select signal and a column select signal.

However, Taylor disclosed selecting which processing elements are active in response to a row select signal and a column select signal (Taylor: Figure 1, column 4 lines 7-29).

The row and column select signals allow the array processor to locally modify global shift instructions (Taylor: Column 2 lines 42-54). The advantage of increased flexibility in shifting operations would have motivated one of ordinary skill in the art to implement row and column select signals. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement row and column select signals for the advantage of increased flexibility in global shift operations.

28. As per claim 14:

Claim 14 essentially recites the same limitations of claim 7. Therefore, claim 14 is rejected for the same reasons as claim 7.

29. As per claim 28:

Claim 28 essentially recites the same limitations of claim 7. Therefore, claim 28 is rejected for the same reasons as claim 7.

Response to Arguments

30. The arguments presented by Applicant in the response, received on 3/19/2010 are partially considered persuasive.

31. Applicant argues “Paragraph [0065] demonstrates, at a minimum, that the inventor was in possession of the concept of shifting the data a number of times equal to the number of PEs in a row or column so that each PE will see every data value held by all the other PEs in the row or column … Those paragraphs demonstrate, at a minimum, that the inventor was in possession of the concept of each PE selecting as its output any of the data values that it sees, and if the data is shifted a number of times equal to the number of PEs in a row or a column per paragraph [0065], then each PE sees all the data values in its row or column … This paragraph, at a minimum, demonstrates that the inventor was in possession of the concept of having all the PEs responding to the same command and contemplates that the command is performed a plurality of times to enable each PE to select "different data at different points during the execution of the instruction thereby enabling various types of data manipulations."

The examiner agrees for the following reasons. The examiner agrees with the conclusion made in view of paragraph 65 that clearly supports possession of shifting a number of times equal to the length or depth of a row or column where all PE’s will see all data in the row/column. The examiner also agrees in the following paragraphs 66-67 that possession is shown for PE’s selecting any data values that the PE’s see. Finally, in view of paragraphs 73-74, the examiner agrees that there’s possession of the

concept of the PE's responding to the same command because "all of the PE's" respond to "the same command" to perform a specific shifting operation. While figures 15a-d and their support in the specification doesn't explicitly state that the operation is done by the same command to allow for each PE to see all of the data, such a limitation has possession in view of the knowledge of one of ordinary skill in the art that the wrap shift command in figure 15a that is able to shift "a number of times equal to the number of PE's in a row" as described in paragraph 65. Thus, the rejections in view of 112 first and second paragraph for claims 1-15, 22-29, and 36 have been withdrawn.

32. Applicant argues "No such selection of data is performed by the rotate RAMs 20 of Crozier. The rotate RAMs of Crozier are illustrated in detail in FIG. 3 of Crozier. As seen in FIG. 3, all of the data going into the static RAM comes out of the static RAM. The purpose of the static RAM and delay elements is merely to delay the data in one row relative to the data in another row. However, there is no selection of data inasmuch as all of the data that goes into the RAM, comes out of the RAM. For that reason, there is no selecting operation performed on the received data, where each of the received data is a candidate for selection."

The examiner disagrees for the following reasons. The combination uses the processing array of Pechanek to store the array data between shiftings. The shifting of the data inherently includes the selecting of data at it's final destination. The shifting of a row X places inherently requires that in the combination, an array PE selects and stores the data that it receives once the shifting has finished. Additionally, the claim

languages argued is largely indiscernible from the language that was upheld by the Board of Patent Appeals and Interferences.

The examiner notes an amendment that would likely overcome the current combination of Crozier and Pechanek. Claims 1 and 8 essentially disclose a plurality of shifting operations that result in each PE in a row or column receiving data held in every other PE in the corresponding row or column. Crozier is able to disclose this limitation since such an shifting occurs for each directional shifting in figures 5a-d. An amendment that specified that a plurality or all shifts in each direction resulted in each PE receiving all data held in every other PE in the corresponding row or column would likely overcome the current combination if claimed correctly.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The following is text cited from 37 CFR 1.111(c): In amending in reply to a rejection of claims in an application or patent under reexamination, the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. The applicant or patent owner must also show how the amendments avoid such references or objections.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JACOB PETRANEK whose telephone number is (571)272-5988. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4162. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jacob Petranek/
Examiner, Art Unit 2183